

LBI PROJECT #2468

Mutagenic Evaluation of Compound FDA 71-81, Monocalcium Phosphate-6/30/75

MUTAGENIC EVALUATION OF

COMPOUND FDA 71-81

007758238

MONOCALCIUM PHOSPHATE

SUBMITTED TO

FOOD & DRUG ADMINISTRATION
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
ROCKVILLE, MARYLAND

SUBMITTED BY

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JUNE 30, 1975



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EVALUATION SUMMARY

Compound FDA 71-81, Monocalcium Phosphate, did not exhibit genetic activity in any of the in vitro microbial assays employed in this evaluation.



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DATE: June 30, 1975

SPONSOR: Food and Drug Administration, Contract Number 223-74-2104

SUBJECT: Evaluation of Test Compound 007758238 Monocalcium Phosphate FDA 71-81

I. OBJECTIVE

The objective of this study was to evaluate the test compound for genetic activity in microbial assays with and without the addition of mammalian metabolic activation preparations.

II. MATERIALS

A. Test Compound

1. Date Received: August, 1974
2. Description: Fine white powder

B. Indicator Microorganisms

The following strains of indicator microorganisms were used in the evaluation:

Yeast Strain: Saccharomyces cerevisiae, strain D4

Bacteria Strains: Salmonella typhimurium, strains: TA-1535
TA-1537
TA-1538

C. Reaction Mixture

The following reaction mixture was employed in the activation tests:

<u>Component</u>	<u>Final Concentration/ml</u>
1. TPN (sodium salt)	6 μ M
2. Isocitric acid	49 μ M
3. Tris buffer, pH 7.4	28 μ M
4. MgCl ₂	1.7 μ M
5. Tissue homogenate fraction	72 mg



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D. Tissue Homogenates and Supernatants

The tissue homogenates and 9,000 x g supernatants were prepared from tissues of the following mammalian species: Mouse-ICR random bred adult males; rat-Sprague-Dawley adult males; and primate-Macaca mulatta adult males.

E. Positive Control Compounds

Table 1 lists chemicals for positive controls in the direct and activation assays.

TABLE 1
POSITIVE CONTROLS USED IN DIRECT AND ACTIVATION ASSAYS

<u>Assay</u>	<u>Chemical</u> ^a	<u>Solvent</u>	<u>Probable Mutagenic Specificity</u>
Nonactivation	Ethyl methanesulfonate	Water or saline	BPS ^b
	2-Nitrofluorene	Dimethylsulfoxide ^c	FS ^b
	Quinacrine mustard	Water or saline	FS ^b
Activation	Dimethylnitrosamine	Water or saline	BPS ^b
	2-Acetylaminofluorene	Dimethylsulfoxide ^c	FS ^b

^a Concentrations given in the Results Section

^b BPS = base-pair substitution; FS = frameshift

^c Previously shown to be non-mutagenic

III. METHODS

A. Toxicity

The solubility, toxicity and doses for all chemicals were determined prior to screening.

Each chemical was tested for survival against the specific indicator strains over a range of doses to determine the 50% survival dose. Bacteria were tested in phosphate buffer, pH 7.4, for one hour at 37°C on a shaker. Yeasts were tested in phosphate buffer, pH 7.4, for four hours at 30°C on a shaker. The 50% survival curve and the 1/4 and 1/2 50% doses calculated.

If no toxicity was obtained for a chemical with a given strain, then a maximum dose of 5% (w/v) was used against the strain.

Unless otherwise specified, the doses calculated for the tests in buffer were applied to the activation tests. The solubility of the test chemical under treatment conditions is stated in the Results Section.

B. Plate Tests

In the nonactivation procedure, approximately 10^9 cells of a log phase culture of the bacterial indicator strains were spread over the surface of a minimal plate, and a measured amount of the test chemical was placed in the center of the test plate. In activation tests, the test chemical was added to the cells, and an aliquot of the mixture was spread on the surface of the test plate. The reaction mixture (0.1 ml) plus tissue extract was then spotted on the surface of the plate. Positive and solvent controls were included. All plates were incubated at 37°C for four days and then scored. Each compound (Test, Positive Control and Solvent Control) was done in duplicate. Concentrations of the positive control compounds are listed in the Results Section.

C. Suspension Tests

1. Nonactivation

Log-phase bacteria and stationary-phase yeast cultures of the indicator organisms were grown in complete broth, washed and resuspended in 0.9% saline to densities of 1×10^9 cells/ml and 5×10^7 cells/ml, respectively. This constituted the working stock for tests of a group of test chemicals and their respective controls. Tests were conducted in plastic tissue culture plates. Cells plus appropriate volume(s) of the test chemical were added to the wells to give a final volume of 1.5 ml. The solvent replaced the test chemical in the negative controls. Treatment was at 30°C for four hours for yeast tests and at 37°C for one hour for bacterial tests. All flasks were shaken during treatment. Following treatment, the plates were set on ice. Aliquots of cells were removed, diluted in sterile saline (4°C) and plated on the appropriate complete media. Undiluted samples from flasks containing the bacteria were plated on minimal selective medium in reversion experiments. Samples from a 10^{-1} dilution of treated cells were plated on the selected media for enumeration of gene conversion with strain D4. Bacterial plates were scored after incubation for 48 hours at 37°C. The yeast plates were incubated at 30°C for 3-5 days before scoring.

2. Activation

Bacteria and yeast cells were grown and prepared as described in the nonactivation tests. Measured amounts of the test and control chemicals plus 0.25 ml of the stock-cell suspension were added to wells of the Linbro plate containing the appropriate tissue fraction and reaction mixture. All flasks (bacteria and yeast) were incubated at 37°C in an oxygen atmosphere with shaking. The treatment times as well as the dilutions, plating procedures and scoring of the plates were the same as described for nonactivation tests.



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D. Preparation of Tissue Homogenates and 9,000 x g Cell Fractions

Male animals (sufficient to provide the necessary quantities of tissues) were killed by cranial blow, decapitated and bled. Organs were immediately dissected from the animal using aseptic techniques and placed in ice-cold 0.25 M sucrose buffered with Tris at pH of 7.4. Upon collection of the desired quantity of organs, they were washed twice with fresh buffered sucrose and completely homogenized with a motor-driven homogenizing unit at 4°C. The whole organ homogenate obtained from this step was divided into two samples. One sample was frozen at -80°C and the other was centrifuged for 20 minutes at 9,000 x g in a refrigerated centrifuge. The supernatant from the centrifuged sample was retained and frozen at -80°C. These two frozen samples were used for the activation studies.

E. Data Recording and Reporting

Following the specified incubation periods all population plates were scored by an automatic colony counter and the results from each plate of a set were recorded, in ink, on data processing forms. All minimal or other types of selective media plates were hand scored and the results recorded along with the respective population data. Other relevant experimental data were recorded on experimental definition forms. For bacteria strains the number of colonies recorded from either the population or selective plates represents that number in 1 ml of test suspension plated. The numbers recorded for the yeast strain D4 represent the number in 0.5 ml of test suspension plated. The data were then processed and printed from a computer program.



IV. RESULTS SECTION

A. Solubility Properties of the Test Compound

1. Name or code designation of the test compound: 007758238
Monocalcium phosphate
2. Test solvent: Saline
3. Solubility of the test compound under treatment conditions:
Soluble under treatment conditions
4. Additional comments: Fine white powder

B. Toxicity and Dosage Determinations for the Test Compound

1. Test date for toxicity determination: April 11, 1975
2. The 50% survival level was determined for bacteria and yeast indicator organisms by conducting survival curves with the test compound at the following concentrations:

Percent Concentration (w/v or v/v)

10.0
1.0
0.1
0.01
0.001

3. Concentrations of the test compound used in the mutagenicity tests:

<u>Dose</u>	<u>Percent Concentration</u>	
	<u>Bacteria</u>	<u>Yeast</u>
1/4 50% Survival	0.375	2.5
1/2 50% Survival	0.750	5.0
50% Survival	1.500	10.0
Plate Tests	0.750	--



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V. SUMMARY OF TEST RESULTS

Plate Tests

- A. Name or code designation of the test compound: 007758238
 B. Test date: April 25, 1975
 C. Concentration of the test compound: 0.75%

Test	Species	Tissue	REVERTANTS/PLATE					
			TA-1535		TA-1537		TA-1538	
			1	2	1	2	1	2
1. <u>Non-activation</u>								
Solvent Control	---	---	40	41	11	13	27	23
Positive Control ^a	---	---	>10 ³	>10 ³	183	115	98	128
Test Compound	---	---	51	38	9	9	18	29
2. <u>Activation</u>								
Negative Control	---	---	8	12	7	7	6	18
Solvent Control	---	---	13	4	15	16	23	21
Reaction Mixture Control	---	---	7	10	8	8	10	18
Positive Control ^b	Mouse	Liver	>10 ³	>10 ³	41	43	397	420
Positive Control		Lung	11	13	5	12	72	30
Positive Control		Testes	9	11	22	10	19	22
Positive Control	Rat	Liver	>10 ³	>10 ³	41	45	327	340
Positive Control		Lung	12	9	7	7	26	29
Positive Control		Testes	9	11	16	10	14	11
Positive Control	Monkey	Liver	390	329	44	41	363	310
Positive Control		Lung	11	9	7	10	21	24
Positive Control		Testes	9	12	16	6	17	12
Test Compound	Mouse	Liver	22	28	15	17	23	19
Test Compound		Lung	28	29	9	8	21	23
Test Compound		Testes	27	24	9	8	19	16
Test Compound	Rat	Liver	24	27	16	22	19	20
Test Compound		Lung	27	29	9	6	22	20
Test Compound		Testes	27	24	7	8	18	19
Test Compound	Monkey	Liver	21	27	16	20	22	18
Test Compound		Lung	26	29	12	7	20	19
Test Compound		Testes	23	21	5	5	22	18

a TA-1535 EMS 10 µl/plate
 TA-1537 QM 20 µg/plate
 TA-1538 NF 100 µg/plate

b TA-1535 DMNA 50 µM/plate
 TA-1537 AAF 100 µg/plate
 TA-1538 AAF 100 µg/plate



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DATA TABLE TERMS AND ABBREVIATIONS

ABBREVIATION OR TERM	DEFINITION OR EXPLANATION
COMPOUND	Client designated compound number appears in this column.
TEST CODES	<p> NAN = Nonactivation: Solvent Control NAP = Nonactivation: Positive Control NA1 = Nonactivation: Test Compound Dose 1 NA2, etc. = Reflects the other dose level(s) </p> <p> A+C = Negative Chemical Control A-C = Activation: Solvent Control ACP = Activation: Positive Control ACT = Activation: Test Compound A+T = Activation: Tissue Control </p> <p> LI = Liver Tissue Activation Fraction LU = Lung Tissue Activation Fraction KI = Kidney Tissue Activation Fraction TE = Testes Tissue Activation Fraction 1,2, etc. = Dose Levels </p>
CONCENTRATION	<p>All test compound dose levels are expressed as a whole number followed by an exponent (negative) identified by the appropriate units.</p> <p>Example: 0025-2PCT = 0.25 percent concentration</p>
POPU	Total number of viable cells in the plating sample raised to some exponent printed directly below the abbreviation (i.e., $EP + 6 = x \cdot 10^6$).
MUT 1	Total number of mutants or convertants obtained from the sample plated raised to some exponent printed directly below the abbreviation (i.e., $EP + 0 = 10^0$). For strain D4, MUT 1 represents the number of ADE+ convertants.
MUT 2	Only used for strain D4 and represents the number of TRY+ convertants in the plated sample.
FREQ 1	The calculated mutation or gene conversion frequency times the negative exponent written directly below. For strain D4, FREQ 1 represents the ADE+ value.
FREQ 2	Only used for strain D4 and represents the TRY+ conversion frequency.
CONTAM	Presence of contamination on any plates.



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DATA TABLE TERMS AND ABBREVIATIONS (continued)

ABBREVIATION OR TERM	DEFINITION OR EXPLANATION
AAF	2-Acetylaminofluorene
DMSO	Dimethylsulfoxide
DMN	Dimethylnitrosamine
EMS	Ethyl Methanesulfonate
QM	Quinacrine Mustard
NF	Nitrofluorene
SPECIES	Animal Strains
SPRDAW	Sprague Dawley Rats
ICRFLO	Flow ICR Random Bred Mice
RHESUS	Rhesus Monkey (<u>Macaca mulatta</u>)
MIXEDB	Dog, Mixed Breed
NEWZEA	New Zealand White Rabbit

LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES / COMPOUND 007758238

TEST	ORG	TA1535 HIS EX-8	TA1538 HIS EX-8	TA1537 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
NAN		5.93	8.10	2.32	1.21	1.69
NAP		145.25	256.53	54.95	102.54	192.66
NA1		5.24	7.00	2.32	1.71	3.89
NA2		7.05	6.33	0.20	1.33	1.43



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES ICRFLO/MOUSE

COMPOUND 007758238

TEST	ORG	TA1535 HIS EX-8	TA1538 HIS EX-8	TA1537 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
ACT	A+C	25.16	5.49	10.13	3.11	2.43
ACT	A+T	10.85	19.43	7.69	3.17	3.04
ACT	A-C	30.64	4.80	11.85	1.46	2.47
ACT	PLI	99.45	96.04	20.85	4.07	7.05
ACT	PLU	32.03	9.09	15.03	2.32	2.32
ACT	PTE	23.13	12.00	7.90	3.94	1.69
ACT	LI1	11.36	9.65	8.97	3.35	5.45
ACT	LI2	13.12	8.78	12.77	5.28	5.13
ACT	LU1	20.17	4.90	18.18	2.85	2.48
ACT	LU2	19.34	4.89	14.41	4.04	3.31
ACT	TE1	26.00	5.71	16.94	3.24	1.75
ACT	TE2	29.16	3.23	15.84	1.99	1.77



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES SPRDAW/RAT

COMPOUND 007758238

TEST	ORG	TA1538 HIS EX-8	TA1538 HIS EX-8	TA1537 HIS EX-8	TA1535 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
ACT	A+C	5.08		25.00	4.13	2.42	1.16
ACT	A+T	11.94		16.99	19.55	1.31	1.19
ACT	A-C	4.90	2.85	10.34	3.40	1.19	1.39
ACT	PLI	25.88		23.46	655.87	6.42	8.88
ACT	PLU	9.79		15.63	5.92	2.53	3.29
ACT	PTE	7.41		13.52	11.07	2.51	2.16
ACT	LI1	6.00		18.24	4.33	2.58	3.63
ACT	LI2	16.44	10.48	8.07	3.45	3.54	3.67
ACT	LU1	8.37		11.47	5.49	1.80	2.30
ACT	LU2	4.50		7.68	4.53	3.41	3.29
ACT	TE1	11.06		15.17	3.74	3.24	3.14
ACT	TE2	7.94		10.88	3.94	3.01	2.04



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LITTQX BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES RHESUS/MONKEY

COMPOUND 007758238

TEST	ORG	TA1537 HIS EX-8	TA1538 HIS EX-8	TA1537 HIS EX-8	TA1535 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
ACT	A+C		5.15	17.39	13.57	2.10	1.65
ACT	A+T		7.48	33.71	7.81	2.38	1.70
ACT	A-C	12.53	1.80	15.22	8.46	1.31	2.15
ACT	PLI		13.89	57.35	165.66	2.46	1.74
ACT	PLU		3.05	18.75	7.04	2.78	2.16
ACT	PTE		3.81	18.10	7.46	3.99	2.07
ACT	LI1	2.88	4.15	46.48	15.58	1.59	1.84
ACT	LI2		6.36	17.83	8.89	2.85	2.37
ACT	LU1		1.79	8.00	10.49	2.79	1.74
ACT	LU2		3.15	16.29	6.27	1.28	2.04
ACT	TE1		2.95	13.71	6.97	3.95	3.26
ACT	TE2		4.99	14.97	8.91	2.29	1.02



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VI. INTERPRETATION OF RESULTS AND CONCLUSIONS

Compound 007758238, Monocalcium Phosphate, was tested for genetic activity in a series of in vitro microbial assays with and without metabolic activation. The following results were obtained:

A. Salmonella typhimurium

1. Plate tests

At a concentration of 0.75%, 007758238, was not mutagenic for any of the bacterial indicator strains with or without activation.

2. Nonactivation suspension tests

The results of these tests were negative.

3. Activation suspension tests

The results of these tests were negative. The LI2 dose with TA-1538 using rat tissue and the LI1 dose with TA-1537 using monkey tissue were repeated because of increased frequencies. The repeat tests were negative. The TA-1535 culture used with mouse tissues had a high spontaneous background, but the data appeared acceptable.

B. Saccharomyces cerevisiae

1. Nonactivation suspension tests

The results of these tests were negative.

2. Activation suspension tests

The results of these tests were negative.

C. Conclusions

The test compound, Monocalcium Phosphate, did not exhibit genetic activity in the in vitro assays employed in this evaluation.

Submitted by:



David Brusick, Ph.D.
Director of Genetics



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APPENDIX
Tabulation of Data



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

		CONTRACT 22374-2104				PROJECT 02468	DATE - 07/08/75
EXPERIMENT 512904		DETECTOR TA1535		SPECIES		/	
COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	NAN		SALINE	0910	0054	5.93	0
	NAP		EMS 0.002 %	0853	1239	145.25	0
007758238	NA1		0075-2 PCT.	0801	0042	5.24	2
007758238	NA2		0375-3 PCT.	0766	0054	7.05	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104
EXPERIMENT 515502 DETECTOR TA1537 SPECIES / PROJECT 02468

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	NAN		SALINE	0345	0008	2.32	0
	NAP		QM 1.0 UG/ML	0424	0233	54.95	0
007758238	NA1		0075-2 PCT.	0388	0009	2.32	0
007758238	NA2		0375-3 PCT.	0489	0001	0.20	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104
EXPERIMENT 512903 DETECTOR TA1538 SPECIES PROJECT 02468
/

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
007758238	NA1		0075-2 PCT.	0557	0039	7.00	0
007758238	NA2		0375-3 PCT.	0569	0036	6.33	0
	NAN		DMSO	0506	0041	8.10	0
	NAP		NF 125 UG-ML	0444	1139	256.53	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

		CONTRACT 22374-2104		PROJECT 02468				DATE - 07/08/75	
EXPERIMENT 515604		DETECTOR 0000D4		SPECIES /					
COMPOUND	TEST	ORG ID	CONCENTRATION	POPULATION EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	NAN		SALINE	0828	0010	0014	1.21	1.69	0
	NAP		EMS 1.0 %	0354	0363	0682	102.54	192.66	5
007758238	NA1		0005-0 PCT.	0643	0011	0025	1.71	3.89	0
007758238	NA2		0025-1 PCT.	0978	0013	0014	1.33	1.43	1



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 515606 DETECTOR TA1535 SPECIES ICRFLO/MOUSE

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	2047	0515	25.16	0
	A+T		***NO MATCH***	1253	0136	10.85	2
	A-C		SALINE	1671	0512	30.64	0
	ACP	LI	DMN 50 UM/ML	1276	1269	99.45	2
	ACP	LU	DMN 50 UM/ML	1564	0501	32.03	0
	ACP	TE	DMN 50 UM/ML	2240	0518	23.13	0
007758238	ACT	LI1	0075-2 PCT.	2941	0334	11.36	2
007758238	ACT	LI2	0375-3 PCT.	2911	0382	13.12	0
007758238	ACT	LU1	0075-2 PCT.	2132	0430	20.17	2
007758238	ACT	LU2	0375-3 PCT.	2869	0555	19.34	0
007758238	ACT	TE1	0075-2 PCT.	2615	0680	26.00	0
007758238	ACT	TE2	0375-3 PCT.	2270	0662	29.16	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 517001 DETECTOR TA1537 SPECIES ICRFLO/MOUSE

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0800	0081	10.13	0
	A+T		***NO MATCH***	0273	0021	7.69	3
	A-C		DMSO	0464	0055	11.85	0
	ACP	LI	AAF 800 UG/ML	0470	0098	20.85	0
	ACP	LU	AAF 800 UG/ML	0366	0055	15.03	0
	ACP	TE	AAF 800 UG/ML	0633	0050	7.90	2
007758238	ACT	LI1	0075-2 PCT.	0591	0053	8.97	0
007758238	ACT	LI2	0375-3 PCT.	0415	0053	12.77	0
007758238	ACT	LU1	0075-2 PCT.	0539	0098	18.18	0
007758238	ACT	LU2	0375-3 PCT.	0555	0080	14.41	0
007758238	ACT	TE1	0075-2 PCT.	0496	0084	16.94	0
007758238	ACT	TE2	0375-3 PCT.	0543	0086	15.84	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 515501 DETECTOR TA1538 SPECIES ICRFLO/MOUSE

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0364	0020	5.49	1
	A+T		***NO MATCH***	0211	0041	19.43	1
	A-C		DMSO	0229	0011	4.80	1
	ACP	LI	AAF 800 UG/ML	0227	0218	96.04	1
	ACP	LU	AAF 800 UG/ML	0231	0021	9.09	1
	ACP	TE	AAF 800 UG/ML	0275	0033	12.00	1
007758238	ACT	LI1	0075-2 PCT.	0259	0025	9.65	1
007758238	ACT	LI2	0375-3 PCT.	0319	0028	8.78	1
007758238	ACT	LU1	0075-2 PCT.	0286	0014	4.90	1
007758238	ACT	LU2	0375-3 PCT.	0266	0013	4.89	1
007758238	ACT	TE1	0075-2 PCT.	0333	0019	5.71	1
007758238	ACT	TE2	0375-3 PCT.	0279	0009	3.23	1



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 515407 DETECTOR 0000D4 SPECIES ICRFLO/MOUSE DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0740	0023	0018	3.11	2.43	3
	A+T		***NO MATCH***	0756	0024	0023	3.17	3.04	7
	A-C		SALINE	0892	0013	0022	1.46	2.47	6
	ACP	LI	DMN 90 UM/ML	0738	0030	0052	4.07	7.05	6
	ACP	LU	DMN 90 UM/ML	0734	0017	0017	2.32	2.32	0
	ACP	TE	DMN 90 UM/ML	0710	0028	0012	3.94	1.69	3
007758238	ACT	LI1	0005-0 PCT.	0716	0024	0039	3.35	5.45	3
007758238	ACT	LI2	0025-1 PCT.	0682	0036	0035	5.28	5.13	7
007758238	ACT	LU1	0005-0 PCT.	0807	0023	0020	2.85	2.48	0
007758238	ACT	LU2	0025-1 PCT.	0816	0033	0027	4.04	3.31	1
007758238	ACT	TE1	0005-0 PCT.	0741	0024	0013	3.24	1.75	4
007758238	ACT	TE2	0025-1 PCT.	0903	0018	0016	1.99	1.77	6



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 513401 DETECTOR TA1535 SPECIES SPRDAW/RAT

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0460	0019	4.13	2
	A+T		***NO MATCH***	0312	0061	19.55	2
	A-C		SALINE	0764	0026	3.40	0
	ACP	LI	DMN 50 UM/ML	0315	2066	655.87	2
	ACP	LU	DMN 50 UM/ML	0287	0017	5.92	0
	ACP	TE	DMN 50 UM/ML	0253	0028	11.07	2
007758238	ACT	LI1	0075-2 PCT.	0809	0035	4.33	2
007758238	ACT	LI2	0375-3 PCT.	1015	0035	3.45	2
007758238	ACT	LU1	0075-2 PCT.	0674	0037	5.49	0
007758238	ACT	LU2	0375-3 PCT.	0728	0033	4.53	0
007758238	ACT	TE1	0075-2 PCT.	1123	0042	3.74	2
007758238	ACT	TE2	0375-3 PCT.	1143	0045	3.94	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 515404 DETECTOR TA1537 SPECIES SPRDAW/RAT

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0432	0108	25.00	0
	A+T		***NO MATCH***	0153	0026	16.99	0
	A-C		DMSO	0812	0084	10.34	0
	ACP	LI	AAF 800 UG/ML	0243	0057	23.46	0
	ACP	LU	AAF 800 UG/ML	0288	0045	15.63	2
	ACP	TE	AAF 800 UG/ML	0318	0043	13.52	0
007758238	ACT	LI1	0075-2 PCT.	0318	0058	18.24	0
007758238	ACT	LI2	0375-3 PCT.	0545	0044	8.07	0
007758238	ACT	LU1	0075-2 PCT.	0436	0050	11.47	0
007758238	ACT	LU2	0375-3 PCT.	0469	0036	7.68	0
007758238	ACT	TE1	0075-2 PCT.	0389	0059	15.17	0
007758238	ACT	TE2	0375-3 PCT.	0432	0047	10.88	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 514804 DETECTOR TA1538 SPECIES SPRDAW/RAT

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0512	0026	5.08	0
	A+T		***NO MATCH***	0268	0032	11.94	0
	A-C		DMSO	0449	0022	4.90	0
	ACP	LI	AAF 800 UG/ML	0510	0132	25.88	0
	ACP	LU	AAF 800 UG/ML	0613	0060	9.79	0
	ACP	TE	AAF 800 UG/ML	0634	0047	7.41	0
007758238	ACT	LI1	0075-2 PCT.	0400	0024	6.00	0
007758238	ACT	LI2	0375-3 PCT.	0651	0107	16.44	0
007758238	ACT	LU1	0075-2 PCT.	0466	0039	8.37	0
007758238	ACT	LU2	0375-3 PCT.	0644	0029	4.50	2
007758238	ACT	TE1	0075-2 PCT.	0416	0046	11.06	0
007758238	ACT	TE2	0375-3 PCT.	0655	0052	7.94	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 515402 DETECTOR TA1538 SPECIES SPRDAW/RAT

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A-C		DMSO	0421	0012	2.85	0
007758238	ACT	LI2	0375-3 PCT.	0544	0057	10.48	3



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

		CONTRACT 22374-2104		PROJECT 02468					
EXPERIMENT 514703		DETECTOR 0000D4		SPECIES SPRDAW/RAT					DATE - 07/08/75
COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0951	0023	0011	2.42	1.16	0
	A+T		***NO MATCH***	0841	0011	0010	1.31	1.19	2
	A-C		SALINE	1010	0012	0014	1.19	1.39	0
	ACP	LI	DMN 90 UM/ML	0732	0047	0065	6.42	8.88	6
	ACP	LU	DMN 90 UM/ML	0791	0020	0026	2.53	3.29	2
	ACP	TE	DMN 90 UM/ML	0878	0022	0019	2.51	2.16	6
007758238	ACT	LI1	0075-2 PCT.	0854	0022	0031	2.58	3.63	0
007758238	ACT	LI2	0375-3 PCT.	0790	0028	0029	3.54	3.67	0
007758238	ACT	LU1	0075-2 PCT.	1392	0025	0032	1.80	2.30	0
007758238	ACT	LU2	0375-3 PCT.	0850	0029	0028	3.41	3.29	0
007758238	ACT	TE1	0075-2 PCT.	1019	0033	0032	3.24	3.14	6
007758238	ACT	TE2	0375-3 PCT.	0930	0028	0019	3.01	2.04	6



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 517501 DETECTOR TA1535 SPECIES RHESUS/MONKEY

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0715	0097	13.57	0
	A+T		***NO MATCH***	0704	0055	7.81	0
	A-C		SALINE	0709	0060	8.46	0
	ACP	LI	DMN 50 UM/ML	0862	1428	165.66	2
	ACP	LU	DMN 50 UM/ML	0796	0056	7.04	0
	ACP	TE	DMN 50 UM/ML	0751	0056	7.46	0
007758238	ACT	LI1	0075-2 PCT.	0918	0143	15.58	0
007758238	ACT	LI2	0375-3 PCT.	1069	0095	8.89	0
007758238	ACT	LU1	0075-2 PCT.	0963	0101	10.49	0
007758238	ACT	LU2	0375-3 PCT.	1084	0068	6.27	0
007758238	ACT	TE1	0075-2 PCT.	0904	0063	6.97	0
007758238	ACT	TE2	0375-3 PCT.	0875	0078	8.91	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 514901 DETECTOR TA1537 SPECIES RHESUS/MONKEY

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0069	0012	17.39	0
	A+T		***NO MATCH***	0089	0030	33.71	2
	A-C		DMSO	0046	0007	15.22	1
	ACP	LI	AAF 800 UG/ML	0068	0039	57.35	1
	ACP	LU	AAF 800 UG/ML	0128	0024	18.75	0
	ACP	TE	AAF 800 UG/ML	0116	0021	18.10	2
007758238	ACT	LI1	0075-2 PCT.	0071	0033	46.48	1
007758238	ACT	LI2	0375-3 PCT.	0129	0023	17.83	2
007758238	ACT	LU1	0075-2 PCT.	0175	0014	8.00	2
007758238	ACT	LU2	0375-3 PCT.	0178	0029	16.29	3
007758238	ACT	TE1	0075-2 PCT.	0197	0027	13.71	0
007758238	ACT	TE2	0375-3 PCT.	0147	0022	14.97	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

		CONTRACT 22374-2104		PROJECT 02468			
EXPERIMENT 515403		DETECTOR TA1537		SPECIES RHESUS/MONKEY		DATE - 07/08/75	
COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A-C		DMSO	0375	0047	12.53	0
007758238	ACT	L11	0075-2 PCT.	1113	0032	2.88	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 514803 DETECTOR TA1538 SPECIES RHESUS/MONKEY DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0505	0026	5.15	0
	A+T		***NO MATCH***	0481	0036	7.48	3
	A-C		DMSO	0610	0011	1.80	0
	ACP	LI	AAF 800 UG/ML	0893	0124	13.89	0
	ACP	LU	AAF 800 UG/ML	1179	0036	3.05	0
	ACP	TE	AAF 800 UG/ML	0993	0038	3.81	1
007758238	ACT	LI1	0075-2 PCT.	0675	0028	4.15	1
007758238	ACT	LI2	0375-3 PCT.	0739	0047	6.36	2
007758238	ACT	LU1	0075-2 PCT.	1006	0018	1.79	0
007758238	ACT	LU2	0375-3 PCT.	1081	0034	3.15	0
007758238	ACT	TE1	0075-2 PCT.	1324	0039	2.95	2
007758238	ACT	TE2	0375-3 PCT.	0802	0040	4.99	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 515603 DETECTOR 0000D4 SPECIES RHESUS/MONKEY DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0666	0014	0011	2.10	1.65	0
	A+T		***NO MATCH***	0588	0014	0010	2.38	1.70	0
	A-C		SALINE	0838	0011	0018	1.31	2.15	0
	ACP	LI	DMN 90 UM/ML	0690	0017	0012	2.46	1.74	0
	ACP	LU	DMN 90 UM/ML	0647	0018	0014	2.78	2.16	0
	ACP	TE	DMN 90 UM/ML	0677	0027	0014	3.99	2.07	0
007758238	ACT	LI1	0005-0 PCT.	0817	0013	0015	1.59	1.84	0
007758238	ACT	LI2	0025-1 PCT.	0632	0018	0015	2.85	2.37	0
007758238	ACT	LU1	0005-0 PCT.	0861	0024	0015	2.79	1.74	0
007758238	ACT	LU2	0025-1 PCT.	0784	0010	0016	1.28	2.04	4
007758238	ACT	TE1	0005-0 PCT.	0582	0023	0019	3.95	3.26	0
007758238	ACT	TE2	0025-1 PCT.	0786	0018	0008	2.29	1.02	4